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Notes on the Ichthyology of Surinam (Dutch Guiana)

2

The Surinam representatives of *Gasteropelecus* and *Carnegiella*,
with remarks on the tribe *Gasteropelecidi*¹⁾

by

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INTRODUCTION

This paper, the second note on the fishes of Surinam, is chiefly based on material recently acquired by the Museum. The first paper dealt with the *Callichthyidae* (cf. Beaufortia No. 12).

I am much indebted to Mr. C. A. SPOELSTRA of the „Blijdorp” Zoo-Aquarium in Rotterdam, who took care that the fine collection was preserved in the proper way, and who arranged preservation of specimens in the various localities. The members of the Blijdorp expedition had merely the task to bring back alive fishes for aquatic-dealers as well as the Blijdorp aquarium.

They will regularly send ecological data and supply useful descriptions of surrounding.

The first collection was made on behalf of aquarists, it therefore does not present any essential character of some tributarial ichthyofauna, and merely specimens looking interesting to aquarists were secured.

Nevertheless it is most useful because of the finely preserved specimens of many interesting species of characids and toothcarps, especially the large series of specimens enabling a proper study of the forms.

In the present account all *Gasteropelecidi* material of the Museum collections has been included; moreover I am much obliged to Dr. M. BOESEMANN of the Leiden Museum, who kindly lent me series of both *Gasteropelecus* and *Carnegiella* from the Marowini system.

SYSTEMATIC POSITION OF THE *Gasteropelecidi*

The most important and remarkable feature of the *Gasteropelecidi* is the enormous radial expansion of the hypocoracoids (fig. 1.), which, to some extent is found in *Chalcinidi* only. The very long pectorals with a strong anterior ray can be used like paddles, and enable these little fishes to taxi over the water surface.

¹⁾ Received September 15, 1952.

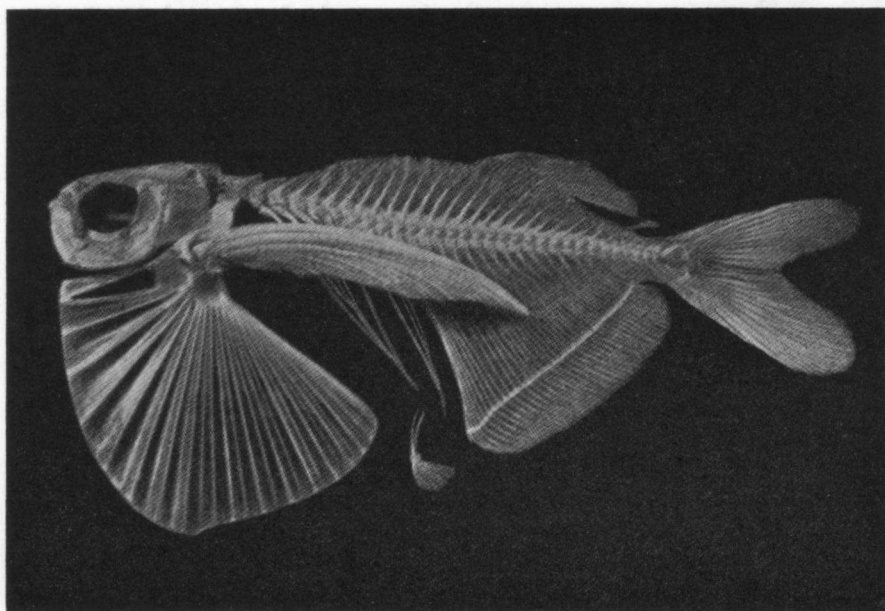


Fig. 1. Skeleton of *Thoracocharax* after RIDEWOOD.

This can be observed very closely in large tanks where we can see them chasing after insects. These "wings" are provided with strong, and comparatively enormous muscles, weighing about one-fourth of the whole fish. The high, and ventrally blade-like compressed bodies offer hardly any resistance to the water, when they taxi along with great speed and even, from time to time, at the end of the run leave the water for some distance. They, do not fly however.

According to their structural features they belong to the subfamily *Characinae*, as understood here, forming a definite tribe, derivable from the most primitive central type, *Brycon*. Despite REGAN's objections I think we can agree with GREGORY & CONRAD (*Zoologica*, 1938, 23 (17) : 335), and place *Chalcinidi* near the structural ancestor of *Gasteropelecidi*.

RELATIONSHIP OF *Gasteropelecidi*

At present 3 genera are recognized, viz. *Gasteropelecus*, *Carnegiella* and *Thoracocharax*. *Gasteropelecus* is represented with at least 7 forms, *Carnegiella* with some 8 forms, and *Thoracocharax* with (?) 3 forms.

Gasteropelecus, like *Carnegiella*, and perhaps also *Thoracocharax* (of which no material is available), has a rather complicated history, particularly its oldest known species (genotype). No doubt *Gasteropelecus sternicla* is the type of the genus; opinions differ, however, as to the diagnosis of the typical form.

The first acceptable description by LINNÉ (1758) was based on material from Surinam, specimens from the GRONOW-collection. The description by VALENCIENNES (in CUVIER & VALENCIENNES, 1848, *Hist. Nat. Poiss.*, 22 : 127—129, pl. 640) is again based on two specimens from

Surinam. Neither the original description nor the one by VALENCIENNES, together with the data from fresh material (given here) from Surinam, agree with the diagnosis by FRASER-BRUNNER (op. cit.) however.

Gasteropelecus, as far as known, represented by some 7 forms, consists of but 2 species, *sternicla* and *maculatus*. *Gasteropelecus sternicla* is divided yet into 5 subspecies, and *maculatus* with 2 subspecies.

Although it appears to be problematic to determine which is more advanced, many of few anal rays, many or few median scales, a developed or reduced dentition, high or low body-form, *Gasteropelecus sternicla levis* is considered here to represent the generalized ancestral type of the group, derived from a central Bryconine type, near the stem where also the *Chalcinidi* sprang.

Gasteropelecus sternicla levis ranges almost throughout the Amazon, remaining practically invariable; it is, moreover the least coloured form (type locality indicated in map, fig. 3 with encircled number 1).

The *levis* form is replaced by *marowini* (2) and *sternicla* (3) in Surinam, by *morae* (4) in British Guiana, with a slight increase of colour in the Guiana's, especially in the blackish line along ventral edge and anal base. In the Peruvian Amazon *levis* is replaced by *coronatus* (5), while it has given rise to *maculatus* (6) in the Panama, and *magdalenae* (7) in the Columbian region. The last two forms have developed still more melanophores, and though they entirely fall within the specific limits of *sternicla*. I leave them in the species *maculatus* for the present, because of this pigmentation.

Another, undescribed (?), character supporting the view to take *levis* (or the entire *sternicla*-group) as the central type of the *Gasteropelecids*, I first found in Surinam specimens of *sternicla*, and later on also in *levis* and *marowini*. This little "organ" is figured below (fig. 2.), and it clearly is a rudiment of the median lateral line usually developed in most Characids, but completely vanished in *Gasteropelecids*, in favour of the

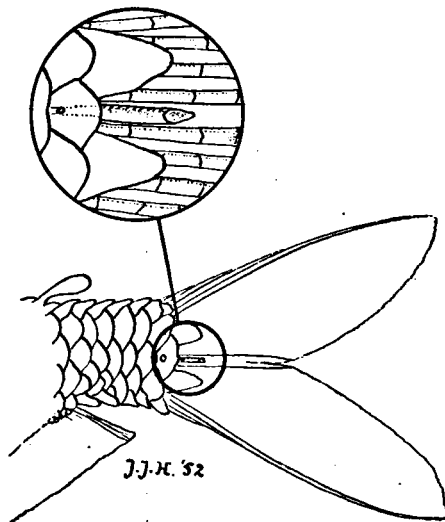


Fig. 2. Caudal sensory rudiment in *Gasteropelecus*.

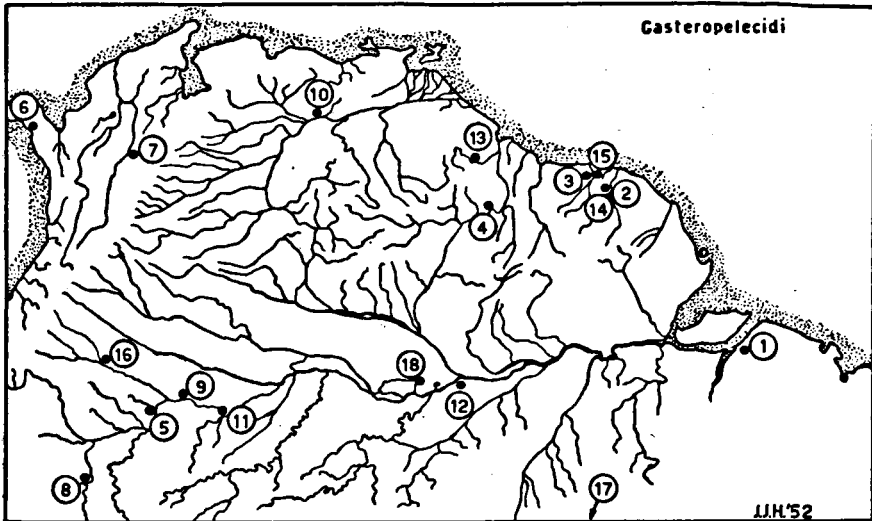


Fig. 3. Map showing type localities of *Gasteropelecidi* in the northern part of South-America. The figures in this map, and all those in any of the tables refer to the list of species and subspecies below.

LIST OF SPECIES AND SUBSPECIES OF *GASTEROPELECIDI*,
WITH ACCEPTED TYPE LOCALITIES

Gasteropelecus SCOPOLI, 1777

- | | |
|-----------------------------|--|
| 1. — <i>sternicla levis</i> | — Para (Belem), Brasil |
| 2. — <i>s. marowini</i> | — Marowini Basin, Surinam |
| 3. — <i>s. sternicla</i> | — Paramaribo, Surinam |
| 4. — <i>s. morae</i> | — Mora Passage, British Guiana |
| 5. — <i>s. coronatus</i> | — Iquitos, Peru |
| 6. — <i>m. maculatus</i> | — Mamoni River, Panama |
| 7. — <i>m. magdalenae</i> | — Girardot, Rio Magdalena,
Columbia |

Carnegiella EIGENMANN, 1909

- | | |
|--------------------------------|----------------------------------|
| 8. — <i>myersi</i> | — Yurimaguas, Peru |
| 9. — <i>marthae marthae</i> | — Pehas, Peru |
| 10. — <i>m. schererii</i> | — Caicara de Orinoco, Venezuela |
| 11. — <i>strigata fasciata</i> | — Tabatinga, Brasil |
| 12. — <i>s. strigata</i> | — Manaus, Brasil |
| 13. — <i>s. vesca</i> | — Mazarumi River, British Guiana |
| 14. — <i>s. marowini</i> | — Marowini Basin, Surinam |
| 15. — <i>s. surinamensis</i> | — Paramaribo, Surinam |

Thoracocharax FOWLER, 1907

- | | |
|-------------------------|----------------------|
| 16. — <i>securis</i> | — Rio Napo, Peru |
| 17. — <i>stellatus</i> | — Rio Cujaba, Brasil |
| 18. — <i>pectorosus</i> | — Codajas, Brasil. |

oblique lateral line. This oblique lateral line happens to be but partly developed in most of the specimens examined showing the little caudal organ.

This rudimental caudal organ consists of a bilateral tubular growth, obliquely cut off terminally like the old-fashioned goose-quill. Its length is a little more than the exposed portion of the preceding scale; it is a little shorter in the specimens from the Lower Amazon and a little longer in the Marowini specimens.

This organ seems to be functional in at least the specimens examined, for it was still in contact with the main system of sensory tracks as could be proved with a carmin-solution in a capillary glasstube. The carmin-solution, when brought in at the caudal end could be followed up to run underneath the skin (under the binocular dissecting microscope) to the operculum. There is a functional pore in the scale anterior to this organ; in 17 of more than 300 specimens examined from the Surinam-river there are even pores in 2 or 3 scales anterior.

At first sight the organ reminds one of the glandular organs in the tribe *Glandulocaudidi*, which as a group is doubtless closely allied to the *Gasteropelecidi*.

Regarding the distribution of the genus *Carnegiella* and recognition of subspecies and type-localities even more confusion prevails than with *Gasteropelecus*.

As with so many of the types of early-described genera and species, it is often difficult to locate the place where the type came from. This is all the more awkward since for a better understanding of the distribution and phylogeny of the species, subspecies are recognized.

In his recent revision of the genus *Carnegiella*, FERNANDEZ-YEPEZ (1950.08.21) arrives at the conclusion that the typical form *Carnegiella strigata*, based on material of GÜNTHER (in the British Museum, and not seen by him), is identical with specimens from British-Guiana. Unfortunately no locality was known to GÜNTHER for this material. FERNANDEZ-YEPEZ's decision did at that moment solve a problem, and would have been acceptable, were it not that a few months later FRASER-BRUNNER (1950.11) tackled the same problem in a revision of the *Gasteropelecids*, and decided, after re-examination of the material in question, that it belonged to "the Amazonian form".

Apart from any priority, it seems best to accept the latter view. The type material of *Carnegiella strigata* ssp. did come from Amazonas, however, since Amazonas is more like something abstract, I have restricted the type locality to Manaos, Brazil, which is the locality of the specimen figured by FRASER-BRUNNER in the revision cited. I want further to stipulate that only part of the subspecies *strigata* of FRASER-BRUNNER should be entitled "typical form", since the species named *Carnegiella fasciata* by GARMAN included in *strigata* ssp. by FRASER-BRUNNER, deserves in my opinion at least a subspecific rank.

As to the probable phylogeny of the the *Carnegiella* forms we ought no doubt to consider, *myersi* (8) as close to the stem of the genus, very near *Gasteropelecus*. This view is supported, among other things, by the range of the species, which is at the extreme border of the range of the whole tribe. We can imagine that this species represents the superseded ancest or that would have made way for rapidly spreading offshoots.

Next comes *Carnegiella marthae* with two subspecies in the western part of the distribution of the tribe viz. *marthae* (9) and *schnereri* (10). The relationship of these two subspecies, with ranges so remote is a little obscure. Are they really as closely related as is supposed. If so, we should expect either more localities in between, or take them also for rather old stages in the phylogeny of the group, having been superseded by *strigata* s.l. I prefer accepting the latter view, even if more forms happen to be found in future in the area meant. We must, moreover, regard *marthae* ssp. as situated near the stem of the eastern *strigata* forms.

Of the *strigata* group, *fasciata* comes first with the greatest number of anal rays, and the least depth of body (cf. 11 in map). Next comes *strigata* (12) the typical form, which, in turn, gave rise to *vesca* (13) *marowini* (14), and *surinamensis* (15).

The *Thoracocharax* species (or subspecies?) probably evolved from near the stem, from which also *Gasteropelecus* sprang.

The close affinity of the tribe with *Chalcinidi* is obvious, though we should rather say both groups are offshoots from a common Bryconine ancestor, than regard the *Gasteropelecidi* an offshoot from *Chalcinidi*.

Superfamily CHARACIICAE n.n.

Heterognathi and *Gymnonoti* AUCT.

Family Characidae Gill

Characini MÜLLER, 1842, Arch. f. Naturg., 9 : 323.

Characinae RICHARDSON, 1856, Encycl. Brit., ed. 8, 12 : 245.

Characidae GILL, 1893, Mem. Acad. Nat. Sci., 6 : 131 (diagnosis); ALLEN, 1942, Fish. W. S. America : 214—215; SCHULTZ, 1944, Proc. U.S. Nat. Mus., 95 : 235—367 (no. 3181).

Characinoidei BERG, 1940 (1947), Class. Fish., : 442—443.

Subfamily Characinae (Allen)

Characine group of subfamilies (Fourth division of the family *Characidae*) ALLEN, 1942, l.c. : 253 (grouping together "subfamilies" *Bryconinae*, *Iguanodectinae*, *Characinae*, *Salminae*, *Chalcininae*, *Pyrhulininae*, *Aphyocharacinae*, *Gasteropelecinae*, and *Agoniatinae*).

Characinae HOEDEMAN, 1949 & 1950, Encycl. Water Life, *Cypriniformes*, X.30 : *Carnegiella*, X.311.216.21; *Corynopoma*, X.311.212.11 (including tribes *Bryconini*, *Glanulocaudini*, *Chalcinini*, *Gasteropelecini*, *Iguanodectini*, *Crenuchini*, *Pyrhulinini*, *Agoniatini*, and *Characini*).

Tribe Gasteropelecidi (JORDAN, EVERMANN & CLARK)

Tetragonopterina GÜNTHER, 1864, ex part., Cat. Fish. 5 : 279, 280, 342—343.

Gasteropelecinae EIGENMANN, 1912, Mem. Carn. Mus. 5 (67) : 378 (subfamily of *Characidae*); ALLEN, 1942, l.c. : 266—270.

Gasteropelecidae JORDAN, EVERMANN & CLARK, 1928 (1930), Rept. U.S. Comm. Fish. 2 : 99 (distinct family); FRASER-BRUNNER, 1950, Ann. Mag. N.H., 12th ser, 3 (35) : 959—970 (revision).

KEY TO GENERA, SPECIES AND SUBSPECIES OF *Gasteropelecidi*¹⁾

- 1a anal rays 22—37 ; dorsal rays 7—13 ; median scales 25—35 ; scales with 3—11 striae (more or less in odd scales) radiating from a more or less distinct central point which is an annulus in specimens ; hyporacoids with 9 (*Carnegiella*) or 11 (*Gasteropelecus*) plies and a

¹⁾ Based on average counts and measurements expressed in 100th of standard length.

triangular flap anteriorly (fig. 4), which may have one or two weak foldings too,

- 2a adipose fin present; anal rays 26—37; dorsal rays 10—13; scales 28—35; premaxillary teeth 5—9, in one series; length of first pectoral ray 39—53 (100th of standard length); body plain silvery with a more or less conspicuous black lateral band, and scattered blackish flecks, no dark bands from thoracic edge upwards and backwards; system of sensory tracks well developed (cf. fig. 5A), mandibular track with 4 pores and 1 terminal one anteriorly; this canal joining the fully developed maxillary track, which has no pores, and both fused, continue as opercular track with 6 pores and terminating in another pore just above the midst of the eye; the circum orbital track is almost completely developed, with 7 or 8 pores, genus *Gasteropelecus* SCOPOLI, 1777
- 3a predorsal scales usually 20—24; body not with vertically arranged lines of black spots above and below black lateral line.
..... — *sternicla* (LINNÉ, 1758)
- 4a length of head 26—29; length of snout 2—6; maxillary with 0—4 teeth,
5a pectoral rays normally 10 (av. 10.22); scales 29—31 (av. 30.00),
..... — *s. levis* (EIGENMANN, 1909)
- 5b pectoral rays normally 11 (av. 11.12); scales 32—34.
6a anal rays 32—35; length of head 28—29 (av. 28.54),
7a maxillary teeth mostly 4 (av. 4.76); pectoral length av. 45.80; anal rays mostly 34—35 (av. 34.80); scales mostly 32 (av. 32.20).
..... *s. marowini* new spbspecies
- 7b maxillary teeth mostly 2 or 3 (av. 2.35); pectoral length av. 45.00; anal rays mostly 32—34 (av. 33.15); scales mostly 33 (av. 33.44),
..... *s. sternicla* ssp.
- 6b anal rays 28—31; length of head 23—26; maxillary teeth 3 or 4,
..... *s. morae* new subspecies
- 4b length of head 30; length of snout 7.5; maxillary with one tooth,
..... *s. coronatus* ALLEN, 1942
- 3b predorsal scales usually 18—19; body with vertically arranged lines of black spots below and above black lateral line,
..... — *maculatus* STEINDACHNER, 1879
- 8a anal rays usually 33—35 (av. 33.92); black spot below base of dorsal absent or nearly so; scales 31—33,
..... *m. maculatus* ssp.
- 8b anal rays usually 32—34 (av. 33.04); a black blotch at the base of the dorsal fin consisting of short black streaks; scales 29—31,
..... *m. magdalenae* (EIGENMANN, 1912)
- 2b no adipose fin; anal rays 23—32; dorsal rays 7—11; scales 25—33; premaxillary teeth 5—11; length of first pectoral 35—53; body not plain; system of sensory tracks on head much less developed (at least in *strigata*) than in *Gasteropelecus* (cf. fig. 5B); mandibular track with but 3 pores and 1 terminal one,

- genus *Carnegiella* EIGENMANN, 1909
- 9a thorax without wavy bands; anal rays 33—36; averidge depth of body less than 50.
 — *myersi* FERNANDEZ-YEPEZ, 1950.
- 9b thorax with continuous dark band on edge; anal rays 22—32, — *marthae* MYERS, 1927
- 10a anal rays 27—29; mandibular teeth 4—5, and 6—9 small small ones; thorax speckled with chromatophores,
 — *m. schereri* FERNANDEZ-YEPEZ, 1950
- 10b anal rays 22—24; mandibular teeth 4—6, and 0—5 small ones; thorax with narrow upcurved dark lines,
 — *m. marthae* ssp.
- 9c thorax with wide, irregular, dark oblique, wavy bands; anal rays 23—32; scales 25—32,
 — *strigata* (GÜNTHER, 1864)
- 11a second diagonal band single for the lower half of its length, meeting ventral profile behind vertical from base of pectoral,
 12a anal rays 29—32; predorsal scales 18—20; lateral-line pores 6—12; length of head 24—27; depth of body 52—63.
 — *s. fasciata* (GARMAN, 1890)
- 12b anal rays 25—28; predorsal scales 16—18; lateral-line pores 12—15; length of head 28—29; depth of body 46—48,
 — *s. strigata* ssp.
- 11b second diagonal band double except at the ventral edge, where it usually meets before vertical from base of pectoral,
 13a anal rays 26—29; predorsal scales 19—21; median scales 29—30; lateral line pores 10—15; length of head 26—28 (25—30); depth of body 43—51,
 — *s. vesca* FRASER-BUNNER, 1950
- 13b anal rays 23—27; predorsal scales 16—21; median scales 25—33; lateral line pores 0—12; length of head 23—33; depth of body 40—50,
 14a anal rays (23—27) (av. 25.46); dorsal rays (7—11) (av. 9.04); median scales (25—30) (av. 26.71); predorsal scales (16—20) (av. 18.15); length of head (25—33); (av. 28.07); length pectoral 35—53 (av. 42.70); mandibular teeth 3—7 (av. 5.01) + 4—9 (av. 5.63).
 — *s. surinamensis* new subspecies
- 14b anal rays 25—27 (av. 26.60; dorsal rays 9—11 (av. 9.36); median scales 26—33 (av. 29.19); predorsal scales 18—21 (av. 19.75); length of head 23—29 (av. 25.60); length pectoral 36—48 (av. 43.76); mandibular teeth 5—7 (av. 5.20) + 6—8 (av. 7.66),
 — *s. marowini* new subspecies

1b anal rays 39—44; dorsal rays 14—16; median scales 19—22, each with 8—10 striae (rarely more or less in odd scales) radiating from a central annulus, on both imbedded and exposed parts; hypocoracoids with 16 or 17 plies, fig. 1. Premaxillary teeth in two series, the anterior typically with 2 teeth the posterior with 7 on each side (cf. FRASER-BRUNNER, 1950 : 960).

..... genus *Thoracocharax* FOWLER, 1907
(three species, *stellatus*, *securis*, and *pectorosus*)

Genus *GASTEROPELECUS* Scopoli

Gasteropelecus GRONOW, 1763, Zooph. Gron. Fasc. Anim. Quad. 4 : 135 (generic name not accepted by Intern. Comm. Zool. Nom. (Meeting Paris, July, 1948, Bull. Zool. Nom. 4 : 66); genotype *Clupea sternicla* LINNÉ, 1758).

Gasteropelecus SCOPOLI, 1777, Introd. Hist. Nat. (Gronovian names into Linnaean nomenclature; no type indicated); FRASER-BRUNNER, 1950, l.c. : 960—964 (revision of family *Gasteropelecidae*).

Gasteropelecus GÜNTHER, 1864, Cat. Fish. Br. Mus., 5 : 342 (emended spelling, adopted by many authors).

Pterodiscus EIGENMANN, 1909, Ann. Carn. Mus. 6 : 12 (genotype *Pterodiscus levis* EIGENMANN, 1909, preoccupied by *Pterodiscus* PILSBRY, 1893; name should not be replaced because synonym of *Gasteropelecus* (see also MYERS, 1940, Stanford Ichth. Bull. 2 (1) : 35).

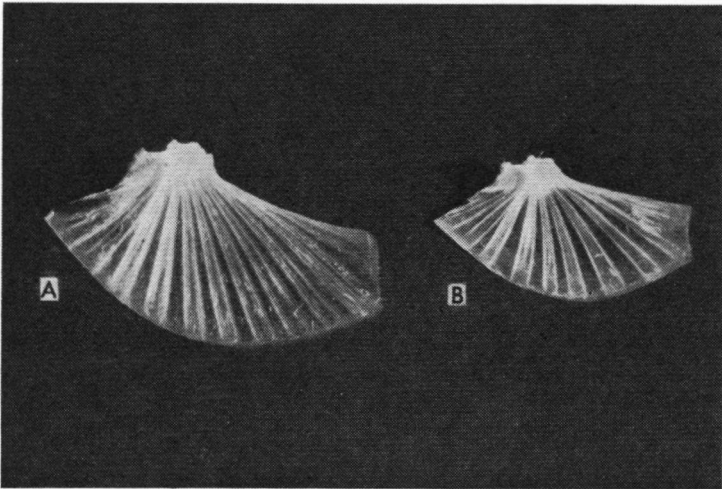


Fig. 4. Hypocoracoids of (A) *Gasteropelecus sternicla sternicla*, and of (B) *Carnegiella strigata surinamensis*, $\times 2\frac{1}{2}$. — Photo J. J. HOEDEMAN.

The most important characters which set *Gasteropelecus* apart from *Carnegiella*, appear to be :

- a. the number of plies in the hypocoracoids, viz. 9 in *Carnegiella* and 11 in *Gasteropelecus*,
- b. the lower dorsal ray count in the latter,
- c. the absence of an adipose fin in the latter,
- d. the reduced(?) system of sensory tracks in *Carnegiella*.

Gasteropelecus sternicla levis (EIGENMANN)

Gasteropelecus sternicla GARMAN, 1890, Bull. Essex Inst. 22 (3): 8 (Tabatinga ?, Lago Alexo, Para, Curupira, Cudajas).

Pterodiscus levis EIGENMANN, 1909, Ann. Carn. Mus., 6: 12 (Para, type locality).

Pterodiscus levis MYERS, 1940, l.c.: 35 (synonymizing *Pterodiscus* (preoccupied) with *Gasteropelecus*).

Gasteropelecus levis FRASER-BRUNNER, 1950, l.c.: 964 (description based (?) on material from Rio Ucayale, Amazon, eastwards to Manaus and Para; a typographical error is evident in this description, which reads: A. 29—32 scales in longitudinal series).

Z.M.A. No. 100.343, 1 female specimen 52.3 mm. st.l., Belem (Para), leg. BOLTEN, 1906.

Z.M.A. No. 100.344, 8 specimens 27.2 to 31.3 mm. st.l., Para, Carnegie Museum, 1907, coll. ?.

Type locality as restricted: Para.

Gasteropelecus sternicla sternicla (LINNÉ)

Clupea sternicla LINNÉ, 1758, Syst. Nat. 10: 319 (Surinam, based on Gronow-collection.)

Gasteropelecus sternicla VALENCIENNES, 1848, l.c.: 127—129 (Surinam, description based on two specimens); FRASER-BRUNNER, 1950, l.c.: 962—963 (part of references; type (holotype!) of species (subspecies) only, not description).

Gasteropelecus sternicla GÜNTHER, 1864, l.c.: 343 (skin (?) of Gronovian specimen only, called "dried like a herbarium specimen" by FRASER-BRUNNER).

Z.M.A. No. 100.342, topotype, finest and largest male specimen, 50.9 mm. st.l., and para-topotype female, 46.7 mm. st.l., Surinam, Paramaribo, coll. ?, aquarium Amsterdam.

Z.M.A. No. 100.340, 2 males, 33.3 and 31.3 mm., and 1 female, 38.5 mm. st.l., Surinam River, near Paramaribo, leg. P. A. HOLTHUIS, Oct. 1951.

Z.M.A. No. 100.348, 1 male, 44.2 mm. st.l., coll. ?, Paramaribo.

Z.M.A. No. 100.349, 95 specimens of 31.5 to 46.9 mm. st.l., C. A. SPOELSTRA leg, Blijdorp, coll. BOWLER, March 15, 1952, Surinam River, Bergendaal, Surinam.

Z.M.A. No. 100.350, 149 specimens of 27.3 to 53.1 mm. st.l., same data as No. 100.349.

Z.M.A. No. 100.351, 297 specimens of 23.4 to 48.7 mm. st.l., same data as No. 100.349.

Type locality as restricted: Paramaribo.

Gasteropelecus sternicla marowini new subspecies

Leiden Museum, holotype, specimen 45.6 mm standard length; paratypes 24 specimens from 27.5 to 45.0 mm standard length; Surinam, Marowini river system, coll. ?, leg. E. C. STOL, Leiden, imported as aquarium fishes, summer 1951.

This subspecies is separable from the close relatives *levis* and *sternicla* spp. on account of the characters given in the key and in tables 1 to 5.

Beside the typical tubular pore on the caudal root being slightly longer in the present than it is in *sternicla* ssp. (cf. fig. 2), there are also one or two pores on the preceding scales.

Restricted type locality: Marowini basin.

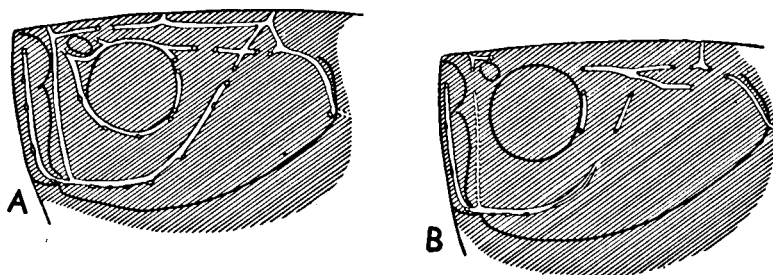


Fig. 5. Sensory tracks on the heads of (A) *Gasteropelecus sternicla sternicla*, and of (B) *Carnegieella strigata surinamensis*.

***Gasteropelecus sternicla morae* new subspecies**

Gasteropelecus sternicla GÜNTHER, 1864, l.c. : 343 (Essequibo, 1 specimen).

Gasteropelecus sternicla EIGENMANN, 1912, Mem. Carn. Mus., 5 (2): 379–380, pl. 55, fig. 4 (material from Wismar, Mora Passage, trenches of Morowhanna, and Isorora, all British Guiana); FRASER-BRUNNER, 1950, l.c. : 962–963, p.p. (British Guiana specimens only; description (?) based on ? material, probably refers to this subspecies).

Z.M.A. No. 100.341, holotype, male specimen, 43.1 mm. st.l., coll. SCHINDELER, Exp. Br. Guiana, 1908, Mora Passage (type locality).

The present subspecies, differing from the other ones in the characters given in the key and in table 1, is based on the above-mentioned specimen, next to the descriptions by EIGENMANN 1912, and FRASER-BRUNNER, 1950. The specimen at hand, having only 28 lateral scales, the same number as given by FRASER-BRUNNER, does not show the peculiar caudal organ (fig. 2). Besides, the low anal count (however, 32 in specimen at hand) puts it well apart from the other subspecies, whereas a slight difference in colouration may be noticed, which is especially concentrated in the larger number of melanophores in the outer rays of the pectoral fin.

***Gasteropelecus sternicla coronatus* ALLEN**

Gasteropelecus coronatus ALLEN, 1942, Fish. West. S. America : 267–268, pl. 14, fig. 4.

This form is only a subspecies of *sternicla*, representing it in the upper Amazon.

Type locality as restricted : Iquitos, Peru.

***Gasteropelecus maculatus maculatus* STEINDACHNER**

Gasteropelecus maculatus STEINDACHNER, 1879, Denkschr. Akad. Wiss. Wien, 41 : 168, pl. 1, fig. 4 (Panama; FRASER-BRUNNER, 1950, l.c. : 961–962 (synonymy, references, drawing of Columbian specimen)).

On authority of FRASER-BRUNNER I refer this form to *Gasteropelecus*, rather than to *Thoracocharax* as is done by EIGENMANN, and SCHULTZ (1944).

It clearly fits well within the specific limits of *sternicla*, and is merely distinct in the larger number of melanophores, which have extended to

Table 1. Fin-ray counts and averidge in subspecies of *Gasteropelecus sternicla*

subspecies	anal												dorsal					pectoral				
	26	27	28	29	30	31	32	33	34	35	36	37	av.	10	11	12	13	av.	10	11	12	av.
1 <i>levis</i>									4	4	1		34.67	F	3	4	2	11.89	7	2		10.22
2 <i>marowini</i>							1	3	7	6	5	3	34.80		18			11.00		22	3	11.12
3 <i>sternicla</i>						2	12	23	11	2	1	1	33.15	4	15			10.79		15	2	11.12
4 <i>morae</i>	F	F	F	F		1	E	E					?	F	F			?		1		?
5 <i>coronatus</i>					A								?		A	A		?	A			?

Table 2. Scale counts and averidge in subspecies of *Gasteropelecus sternicla*

subspecies	median										predorsal							
	28	29	30	31	32	33	34	35	av.	20	21	22	23	24	25	av.		
1 <i>levis</i>		1	7	1	F				30.00	3	3	3				21.00		
2 <i>marowini</i>			5	1	5	12	2		32.20			1	6	16	2	23.76		
3 <i>sternicla</i>	F		2	1	5	9	1		33.44		6	3	4	5		22.44		
4 <i>morae</i>	F							1	?				1			?		
5 <i>coronatus</i>			A						?	A						?		

Table 3. Measurements and averidge in subspecies of *Gasteropelecus sternicla*, expressed in 100th of standard length

subspecies	length of head							depth of body												
	26	27	28	29	30	31	av.	45	46	47	48	49	50	51	52	53	54	55	56	av.
1 <i>levis</i>	2	3	4				27.22	2	1	—	2	2	—	1	1					48.11
2 <i>marowini</i>		2	11	5	5		28.56				1	3	6	6	2	3	2	1	1	51.32
3 <i>sternicla</i>		5	4	6	3	1	28.52			3	4	4	3	2	1	—				49.28
4 <i>morae</i>		1					?											1		?
5 <i>coronatus</i>					A		?											A		?

Table 4. Measurements and averidge in subspecies of *Gasteropelecus sternicla*, expressed in 100th of standard length

subspecies	length of snout											length of first pectoral ray													
	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	av.	39	40	41	42	43	44	45	46	47	48	49	50	51	av.
1 <i>levis</i>	2	1	4	1	1						3.39	1	1	—	—	1	—	3	—	—	—	1	1	1	45.22
2 <i>marowini</i>				2	5	9	6	1	2		5.11					1	3	13	1	2	1	3	1		45.80
3 <i>sternicla</i>			1	7	3	2	5	3	2		4.93	2	—	1	1	2	4	1	1	1	2	2	2		45.00
4 <i>morae</i>								1			?														53.00
5 <i>coronatus</i>										A	?						A	A	A						?

Table 5. Number of teeth and averidge in subspecies of *Gasteropelecus sternicla*

Subspecies	premaxillary						maxillary						mandibular													
	5	6	7	8	9	av.	0	1	2	3	4	av.	3	4	5	6	av.	+	5	6	7	8	9	10	11	av.
1 <i>levis</i>		1	14	3		7.11	5	3				0.38			1	4	5.80	+	2	2						5.50
2 <i>marowini</i>			11	39		7.78		1	1	7	41	3.76	2	3	42	3	4.92	+	1	2	3	16	24	4	2	8.66
3 <i>sternicla</i>	1	2	28	61	3	7.66	3	21	31	28	17	2.35		5	14	1	4.80	+	1	2	6	3	4	5		8.05
4 <i>morae</i>		2				?				1	1	?			1	1	?	+	1	1						?
5 <i>coronatus</i>			A	A		?		A				?			A		?	+	A							?

some black blotches and spots above and below the black lateral band. The indistinct band through the eye along the anterior edge of the thorax is likewise present in specimens of both *levis* and *sternicla* ssp. at hand, however, still less distinct and mostly consisting of but few scattered melanophores.

Type locality as restricted: Mamoni River, Panama.

The specimen (cited above), illustrated by FRASER-BRUNNER, came from Columbia, and probably represents the following subspecies.

***Gasteropelecus maculatus magdalenae* (EIGENMANN)**

Thoracocharax magdalenae EIGENMANN, 1912, Indiana Univ. Bull., 10 (8): 25 (Girardot, Columbia); EIGENMANN, 1920, Indiana Univ. Stud., 7 (46): 10 (Atrato and San Juan River, Columbia);

Thoracocharax maculatus magdalenae SCHULTZ, 1944, Proc. U.S. Nat. Mus. (No. 3181), 95: 275–276 (with table 10, comparing subspecies *maculatus* and *magdalenae*; Maracaibo Basin, Venezuela).

Genus CARNEGIELLA Eigenmann

Carnegiella EIGENMANN, 1909, Ann. Carn. Mus., 6 (1): 13 (genotype by original designation, *Gasteropelecus strigatus* GÜNTHER, 1864); FERNANDEZ-YEPEZ, 1950, Stanford Ichth. Bull., 3 (4): 169–181, figs. 1–4, 1 map, 2 tables (revision of genus); FRASER-BRUNNER, 1950, l.c.: 964–966, fig. 3 (revision of *Gasteropelecidae*); HOEDEMAN, 1951, Het Aquarium, 21 (11): 4 pp., figs. 1–7 (popular account).

***Carnegiella strigata fasciata* (GARMAN)**

Gasteropelecus strigatus STEINDACHNER, 1876, Ichth. Beiträge, 5: 56 (Manacapuru).

Gasteropelecus fasciatus (part) GARMAN, 1890, l.c.: 8–10 (Tabatinga specimens only).

Carnegiella fasciata FERNANDEZ-YEPEZ, l.c.: 180, fig. 1 (holotype of GARMAN from Tabatinga selected as lectotype; other material (paratypes) from Tabatinga and Iquitos; specimens from Lagoa Saraca, Brazil, probably belonging to typical subspecies).

Carnegiella strigata fasciata HOEDEMAN, l.c.: 254, fig. 4.

Carnegiella strigata strigata (part) FRASER-BRUNNER, l.c.: 966 (only GARMAN form included).

On account of the rather extensive description, summarized in tables 6 to 10, given by FERNANDEZ-YEPEZ, I prefer to consider *fasciata* a subspecies rather than a different species. I do not want to include it in the synonymy of *strigata*, as is done by FRASER-BRUNNER.

Type locality as restricted by FERNANDEZ-YEPEZ, Tabatinga.

***Carnegiella strigata strigata* (GÜNTHER)**

Gasteropelecus strigatus GÜNTHER, 1864, Cat. Fish. Brit. Mus. 5: 343 (type-locality unknown).

Gasteropelecus fasciatus (part) GARMAN 1890, Bull. Essex Inst. 22 (3): 10 (material from Lower Amazon only).

Carnegiella strigata FERNANDEZ-YEPEZ, 1950, Stanford Ichth. Bull. 3 (4): 179 (revision; description based on material from localities of subspecies *vesca* and on 2 specimens of the real *strigata* from Cudajas).

Carnegiella strigata strigata FRASER-BRUNNER, 1950, Ann. Mag. N.H. 12, 3 (35): 965–966, fig. 3B (original specimens of GÜNTHER identified as the Amazonian form; no restricted type-locality is yet given, and ssp. *fasciata* is included).

Carnegiella strigata strigata HOEDEMAN, 1950, Het Aquarium, 21 (11): 254, part.

The type locality of this subspecies, defined to the Amazonas by FRASER-BRUNNER, is herewith restricted to Manaus, Brazil.

***Carnegiella strigata vesca* FRASER-BRUNNER**

Carnegiella strigata EIGENMANN, 1909, Ann. Carnegie Mus. 6: 13 (Maduni Creek, Gluck Island, Malali Tumatumari, Potaro Landing; Rupununi Pan, all British Guinea).

Carnegiella strigata FERNANDEZ-YEPEZ, t.c. (material on which description is based, except two Cudajas specimens which belong to *strigata* ssp.)

Carnegiella strigata vesca FRASER-BRUNNER, 1950, l.c.: 965—966, fig. 3A (British Guiana).

Type locality restricted to Mazarumi River, British Guiana.

There may be, or may not be a subspecific difference between the material from the various localities in British Guiana like there appears to be in Surinam. In tables 6 to 10 I have given data from FRASER-BRUNNER (F), and of material from the EIGENMANN collection from Maduni Stop Off, and Potaro River, present in our Museum. The material is insufficient to draw any further conclusions.

***Carnegiella strigata marowini* new subspecies**

Carnegiella strigata vesca BOESEMANN, 1952, Zool. Meded., 31 (17): 190 (first record of a *Carnegiella* from Surinam, Marowini Basin, and Coropina Creek, Republiek).

Leiden Museum, holotype 31.8 mm, and 24 paratypes, 24.4 to 30.5 mm. st.l., leg. E. C. STOL, summer 1951, Marowini River system.

Differing from the close relatives in the meristic features given in tables 6 to 10; especially differing from *surinamensis* in the higher scalecount, and more mandibular teeth.

Type locality restricted: Marowini River, Surinam.

Table 6. Fin-ray counts and averidge in subspecies of *Carnegiella strigata*.

subspecies	anal											dorsal					
	23	24	25	26	27	28	29	30	31	32	av.	8	8	9	10	11	av.
11 <i>fasciata</i> *)			G	G	G	1	5	4	5	1	30.00			5	11		9.70
12 <i>strigata</i>				1	2	2					27.20				5		10.00
13 <i>vesca</i>				F	F	F	F				?			F	F	F	?
— Maduni ¹⁾					1	1					?				2		?
— Potaro ²⁾						2					?					2	?
14 <i>marowini</i>			2	6	17						26.60			18	5	2	9.36
15 <i>surinamensis</i>	3	11	26	34	11						25.46	6	15	37	24	3	9.04

Table 7. Scale counts and averidge in subspecies of *Carnegiella strigata*

subspecies	median										predorsal						
	25	26	27	28	29	30	31	32	33	av.	16	17	18	19	20	21	av.
11 <i>fasciata</i>				Y	Y	Y	Y	Y		?			Y	Y	Y		?
12 <i>strigata</i>					2	3				29.60				?			?
13 <i>vesca</i>					F	F				?				F	F	F	?
— Maduni ¹⁾					1	1				?					2		?
— Potaro ²⁾					2					?					2		?
14 <i>marowini</i>		1	1	3	13	4	1	1	1	29.19			1	10	7	6	19.75
15 <i>surinamensis</i>	1	35	31	15	2	1				26.71	1	7	56	18	3		18.15

*) G. after GARMAN, 1889; F. after FRASER-BRUNNER, 1950; Y. and figures of *fasciata* after FERNANDEZ-YEPEZ, 1950.

1) Z.M.A. No. 100.353, 2 specimens, 19.6 and 19.9 mm. st. l., coll. EIGENMANN, Carnegie Museum, 1908, British Guiana, Maduni Stop Off.

2) Z.M.A. No. 100.354, 2 specimens, 27.7 and 30.1 mm. st.l., as preceding, Potaro Landing, Lower Potaro River.

Table 8. Measurements and averidge in subspecies of *Carnegiella strigata*

subspecies	length of head												depth of body												av.
	23	24	25	26	27	28	29	30	31	32	33	av.	40	41	42	43	44	45	46	47	48	49	50	51	
11 <i>fasciata</i>		Y	Y	Y	Y							?													52-63
12 <i>strigata</i>			?									?							?	?	?				?
13 <i>vesca</i>				F	F	F	F	F				?					F	F	F	F	F	F	F	F	?
— Maduni						1	1					?						1	1						?
— Potaro					2							?								2					?
14 <i>marowini</i>	2	—	11	9	—	2	1					25.60		5	3	1	1	3	4	4	7	—	1		45.88
15 <i>surinamensis</i>			10	22	34	41	31	18	13	2	1	28.07	2	1	15	25	29	27	10	21	23	8	4		45.11

Table 9. Measurements and averidge in subspecies of *Carnegiella strigata*.

subspecies	length of snout						length first pectoral ray																			
	7.0	7.5	8.0	8.5	9.0	av.	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	av.
11 <i>fasciata</i>			?			?										?										?
12 <i>strigata</i>			?			?										?										?
13 <i>vesco</i>			?			?										?										?
— Maduni		1	1			?								1	1											?
— Potaro				2		?												1					1			?
14 <i>marowini</i>	1	5	11	8		8.02		1	—	1	1	—	3	1	2	1	7	6	1	1						43.76
15 <i>surinamensis</i>	1	9	33	27	6	8.18	1	1	2	1	4	9	17	15	11	5	7	5	3	—	3	1	1	1	1	42.70

Table 10. Number of teeth and averidge in subspecies of *Carnegiella strigata*

sspp.	premaxillary							maxillary				mandibular																				
	5	6	7	8	9	10	11	av.	0	1	2	av.	3	4	5	6	7	8	av.	0	1	2	3	4	5	6	7	8	9	10	av.	
11					Y	Y	Y	?		Y		?			Y	Y			?	Y	Y	Y	Y	Y							?	
12				3	7			8.70		1	7	2	1.10			2	6	2	7.00									1	1	6	2	8.90
13					?			?		?		?			?				?						?						?	
M			1	2	1			?		2	2	?			1	1	2		?						1	—		2	1		?	
P					1	3		?		1	1	2	?		1	1	—	2	?								1	1	2	1	?	
14	1	3	8	19	18	1		8.08		2	2	5	1.06		41	8	1		5.20								3	11	36		7.66	
15			4	21	9			8.15		2	2	2	1.00	2	—	27	8	7	5.01					2	14	5	7	5	2		5.63	

Carnegiella strigata *surinamensis* new subspecies

Carnegiella strigata, intermediate form, HOEDEMAN, 1951, l.c.: 255, fig. 6, pp.

Z.M.A. No. 100.316, holotype (syntype), male 30.8 mm., and paratypes, 1 male 29.1 mm. and 2 females 27.4 and 28.7 mm. st.l., Surinam, swamp about 50 km. south of Paramaribo; received alive by plane, leg. W. VELDHUIZEN, October 8, 1951.

Z.M.A. No. 100.315, paratype, 1 female 29.2 mm. st.l., same data as 100.316.

Z.M.A. No. 100.317, paratypes, 1 male 34.4 mm. st.l., Surinam, Paramaribo, leg. WIJDENER, February 1951.

Z.M.A. No. 100.318, paratypes, 7 specimens 25.2—33.9 mm. st.l., Paramaribo, November 1951.

Z.M.A. No. 100.319, paratypes, 5 specimens, 26.6—28.6 mm. st.l., near Paramaribo in creek, November 1951.

Z.M.A. No. 100.321, paratypes, 10 specimens, 25.8—28.6 mm. st.l., swamp near Paramaribo, November 1951.

Z.M.A. No. 100.322, 6 specimens, 27.3—28.9 mm. st.l., swamp between Paramaribo and Zanderij I, November 14, 1951.

Z.M.A. No. 100.323, 29 specimens, 22.1—28.3 mm. st.l., Zanderij I, air-port, November 14, 1951.

Z.M.A. No. 100.352, 22 specimens, 22.2—34.0 mm. st.l., Surinam (? Paramaribo), leg. TIMMERMAN, January 1952.

Z.M.A. No. 100.355, 11 specimens, 18.9—31.2 mm. st.l. Paramaribo, leg. VELDHUIZEN, December 10, 1951.

Z.M.A. No. 100.356, 67 specimens, 20.6—38.6 mm. st.l., creeks near Bergendaal, Surinam River, Blijdorp Exp. I, March 15, 1952.

Type locality as restricted here, Surinam River system, between Paramaribo and Bergendaal.